MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PMT0204 – FUNDAMENTAL MATHEMATICS II

(All sections / Groups)

28 FEBRUARY 2017
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** printed pages including the cover page with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Let $A = \begin{bmatrix} 3 & 3 \\ 1 & 0 \\ 3 & -1 \end{bmatrix}, B = \begin{bmatrix} -4 & 1 \\ 0 & 3 \\ -1 & -3 \end{bmatrix}, C = \begin{bmatrix} 3 & 3 & 4 \\ 1 & -3 & 0 \end{bmatrix}$. Find

i. $C(A - B)$ **(6 marks)**

ii. $C^T . 3A$ **(6 marks)**

b) Find the inverse of the following matrix.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ 2 & 2 & 1 \end{bmatrix}$$ **(9 marks)**

Hence, solve the system of equation.

$$x + 2y + 3z = -9$$
$$x + y + z = 7$$
$$2x + 2y + z = -6$$ **(4 marks)**

Question 2 (25 Marks)

a) Given $\csc\theta = -\frac{11}{4}$, θ in quadrant IV, find the remaining trigonometric function values of θ. **(6 marks)**

b) Consider the function $y = 4\sin\left(x + \frac{\pi}{2}\right) + 4$, find

i. amplitude
ii. period
iii. phase shift **(3 marks)**

Hence, graph the function. **(6 marks)**

c) Find all solutions in the interval $[0, 2\pi]$.

$$\cos^2 x = 2\cos x$$ **(5 marks)**

d) Solve ΔABC given $a = 10, B = 76°, C = 25°$ **(5 marks)**

Continued...

Question 3 (25 Marks)

a) Find the limit of exist. If not, state the reason.

i. $\lim_{x\to 4}(x^4 - 5x^2 + 2)$ **(2 marks)**

ii. $\lim_{x\to 5}\dfrac{x-5}{4(x^2-25)}$ **(4 marks)**

iii. $\lim_{x\to 0}-\dfrac{3}{x}$ **(2 marks)**

b) Differentiate the following.

i. $y = \dfrac{3}{4}x^4 - 5x^2 + 4x + 1$ **(2 marks)**

ii. $y = (6\sqrt{x} + 2)(x^3 - x)$ **(5 marks)**

iii. $y = (x+2)^4(3-x)^2$ **(5 marks)**

iv. $y = \dfrac{1+x^3}{1+x}$ **(5 marks)**

Question 4 (25 Marks)

a) Find the interval where the function is increasing and decreasing. State the maximum and minimum values. **(10 marks)**

$$f(x) = -8x^3 + 9x^2 + 6x - 5$$

b) Evaluate the following integral.

i. $\int(3x^4 - 3\sqrt{x} - 2)\,dx$ **(4 marks)**

ii. $\int\left(x^3\sqrt{x^4+6}\right)dx$ **(6 marks)**

c) Find area under the curve over the indicated interval.

$$y = 6x - x^2 - 8;\ [2,4]$$ **(5 marks)**

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